

BACK PAIN IN KIDS – FYSH

continued from page 12

incidence of facet asymmetry at the level of L4-5 or L5-S1 of 48.6 percent.

Facet tropism reduces the stability of the lumbar spin. The sagittally aligned joint significantly reduces the stiffness coefficient at that spinal level, particularly with extension and rotation. (Van Schaik 1985)

Facet asymmetry at L4-5 or L5-S1 occurs in almost 50% of the population. A loaded back pack causes the involved vertebra to rotate away from the sagittal joint. The most frequently associated long term complication is DJD. (Cercueil 1982)

In summary, facet tropism can generally be classified as an overuse syndrome associated with sporting activities which involve forceful hyperextension, and is a frequent cause of back pain in athletic teenagers.

Spondylolysis

Spondylolysis is an acquired condition involving interruption of the pars interarticularis. It has been suggested by many authors to be due to stress fracture, most commonly to the pars interarticularis of the L5 vertebra. The argument that spondylolysis is acquired and not developmental is based on the following findings:

- radiographic examination of hundreds of fetal and newborn spines reveals no evidence of pars separation (Batts, Rowe);
- the incidence of L5 spondylolysis in 6 year old children has been reported to be 4.4 percent, and
- the incidence of L5 spondylolysis in late adolescence has been reported to be 5.8 percent (Fredrikson).

Spondylolysis is common in the athletic adolescent and preadolescent. One-half of all pediatric back pain in athletic patients is related to disturbances of the

posterior elements including spondylolysis, which presents as low back pain aggravated by activity. Failure to suspect a pars stress fracture is common, often leading to the misdiagnosis of lumbosacral strain. Radiographic evaluation of the child with back pain should include AP and lateral lumbar views, with oblique lumbar imaging, when pars disruption is suspected. The pars defect will be unilateral in about 20 percent of patients (Laurent). A complicating factor in early diagnosis is that plain radiographs, even with oblique films, may not be helpful in diagnosing a pars stress fracture, and other imaging techniques, such as CT, MRI or bone scan may be necessary.

Identifying spondylolysis requires the following:

- Symptoms of lower back pain aggravated by activity
- Pain exacerbated by one-legged hyperextension test
- Confirmation by imaging studies

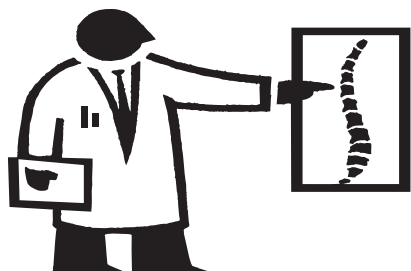
Note: The standing one-legged hyperextension test is performed by having the patient stand on the leg on the side of back pain and gently lean backward. Reproduction of the pain is likely positive for spondylolysis.

Radiographic follow-up is the recommended method of evaluating progression of a pars fracture. The young child with incidental, asymptomatic pars fracture should have yearly radiographic evaluations to assess anterior slippage. During the adolescent growth spurt, which is a time of increased slippage, radiographic evaluation should be performed at least every 6 months. Spondylolysis is most accurately demonstrated with 45° oblique lumbar view, with a 20° cephalad tube tilt (Sty).

Regular physical examinations should be performed to evaluate for postural deformities, such as increased lumbar lordosis, for hamstring tightness and for gait abnormalities. If detected at an early stage, particularly when recent trauma is involved, symptomatic spondylolysis should be treated with several weeks of bed-rest and restriction of activities (Hensinger). The clinical utility of the one-legged hyperextension test in identifying potential cases of pars stress fracture has been demonstrated by several authors (Ralston). Plain radiographs of the lumbar spine are routinely indicated in young patients when clinical suspicion of spondylolysis is high (Royal College of Radiologists, 1995).

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Incidence of Spondylolysis by Sport

Sport	% with Spondylolysis
• Diving	40
• Wrestling	25
• Weight Lifting	22
• Track/field	17
• Gymnastics	17
• Football	16
• Skiing	16
• Judo and martial arts	16
• Tennis	12
• Water polo	11
• Rugby	11
• Volleyball	11
• Basketball	10

ture is common, often leading to the misdiagnosis of lumbosacral strain. Pars fracture may be missed on x-ray. Teplick, et al noted an incidence of 5.4% of pars fractures on CT scan that could not be identified on x-ray, even in retrospect.

Spondylolisthesis

• **Clinical features** — The anterior slippage associated with spondylolisthesis is most often symptomless in children. When symptoms do occur they typically occur during the pubertal or adolescent growth period. Symptoms include a dull ache in the lower back, buttocks and thighs during or after physical activity. Postural changes occur, which can manifest as flattening of the posterior sacrum and pelvis, shortening of the trunk, forward translation of the chest and lumbar hyperlordosis (Shook). Changes in the child's gait pattern can include decreased hip flexion, increased knee flexion, and decreased stride length and walking speed (Meyers).

• **Management of spondylolisthesis** — A spondylolisthesis is more likely to progress (e.g. from grade 1 to grade 2) during an adolescent growth spurt. It

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